

BRIEF COMMUNICATION

Maternal Antibodies in Human Neonatal Sera

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Summary. Three hundred and sixty-three pairs of neonatal and maternal sera collected at delivery just after an influenza A2/Hongkong virus epidemic, were tested by complement fixation for influenza A2 antibodies. The results confirm an earlier suggestion. In this study the neonatal serum level of IgG class antibodies exceeded that of the mother in 109 of 329 cases, when the maternal value was low or normal, but in the case of a high maternal titre, the newborn had a higher titre than that of the mother in only four of thirty-four cases.

INTRODUCTION

Human newborns generally have a higher serum content of IgG and of specific antibodies acquired from the mother than the mother herself (Kohler and Farr, 1966; Michaux, Heremans and Hitzig, 1966; Toivanen, Mäntyjärvi and Hirvonen, 1968; Toivanen, Rossi and Hirvonen, 1969). Evidence has also been presented that this holds true when the maternal values are low or normal, but with a high maternal content of IgG or of specific antibodies the neonatal level is generally lower than the maternal one. This suggestion was first presented on the basis of IgG values for Bantu mothers and neonates (Michaux *et al.*, 1966). We have earlier reported findings of viral antibodies in neonatal and maternal sera supporting this theory (Toivanen *et al.*, 1968). The number of sera with high titres was, however, too small for definite conclusions. The spread of the recent influenza A2/Hongkong virus epidemic to Finland offered an opportunity to extend the previous observations.

MATERIALS AND METHODS

Starting some weeks after the epidemic in February 1969, we collected cord blood samples from all full-term newborns in the Maternity Hospital until April 1969. Blood samples from the mothers were also obtained at the time of delivery. Sera were separated and stored at -40° until tested, corresponding neonatal and maternal sera in the same series. A micro technique of complement fixation was used (Sever, 1962). The antigen was pooled allantoic fluid from chick embryos inoculated with influenza A2/Singapore/1/57. It was dialysed against saline and stored at -60° . Four units of antigen (tested against a human convalescent serum) were used in tests. It has been stated previously (cf. Toivanen *et al.*, 1968) that the complement fixation technique measures almost exclusively IgG viral antibodies. A2/Singapore strain was selected as the test antigen to ascertain that the antibodies measured were from a secondary response and of the IgG class. The titres are expressed as \log_2 of the reciprocals; reciprocals < 4 are considered 2.

RESULTS

The results in Fig. 1 show that cord titres, as a whole, were significantly more often higher than the maternal values ($P < 0.001$ by the sign-test; Siegel, 1956). However, when the maternal \log_2 titre was more than 6 (thirty-four cases) the neonatal titre was higher than the maternal titre in only four instances, equal in sixteen and lower in fourteen cases. In 329 cases with a maternal \log_2 titre ≤ 6 , the newborn had a higher titre than the mother in 109 instances, equal to the mother in 183 cases, and less than the mother in thirty-seven. The regression coefficient 0.873 is significantly different from unity ($P < 0.001$), indicating that in this study the cord and maternal values were not absolutely correlated.

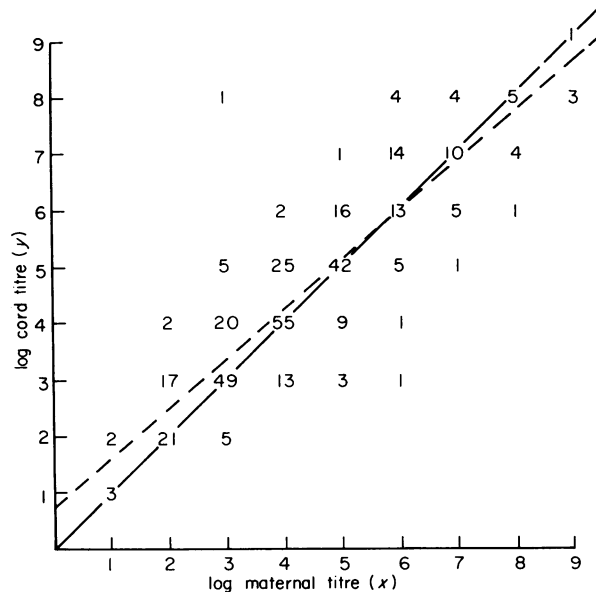


FIG. 1. Complement fixing influenza A2 antibodies in 363 full-term cord and maternal sera. Figures refer to the number of serum pairs. Broken curve represents graph for $y = 0.739 + 0.873x$.

DISCUSSION

This finding with a specific antibody is consistent with an earlier suggestion that the neonatal antibody level on average tends to exceed that of the mother, if the maternal level is low or normal. When the mother has a high content of IgG or of a specific antibody, the neonatal value remained below the maternal one more often than it exceeded it. The usefulness of this phenomenon can be readily understood, but its mechanism is obscure.

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